

Application No.: 10/059,096**Docket No.: 30012962-3 US (1509-264)****REMARKS**

The Office action of October 3, 2005 has been carefully studied.

The amendment to claim 19 obviates the objection to the claim, and withdrawal of the objection is in order.

The claims have been carefully reviewed to correct some antecedent problems, and to eliminate means plus function language to avoid interpretation under 35 U.S.C. §112, paragraph 6.

Claims 1-63 are rejected under 35 U.S.C. §102(b) as being anticipated by Arnold et al., U.S. Patent 6,154,549. Applicants respectfully traverse this rejection.

The present invention relates to audio fields with synthesized sound sources and has three separate aspects:

- (1) the sound sources are located on an at least part-cylindrical notional surface (see independent claims 1, 28 and 46);
- (2) the audio field is explored by rotation about an axis and by movement along that axis (independent claim 15); and
- (3) setting rotation of the audio field about a predetermined axis, in combination with setting a displacement of the audio field relative to a presentation reference in a direction parallel to the axis.

Aspects (2) and (3) do not require the sound sources to be located on an at least part-cylindrical surface.

Arnold et al. discloses how to synthesize sound sources at desired locations within a spatial environment. Embodiments of Arnold et al. are concerned with synthesizing sound

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sources in 3D volumes – for example, Figures 14 to 17 include eight audio transducers 16 located in a 3D volume to synthesize sound sources. In Figures 14 and 15, a rectilinear coordinate system specifies sound source location; in Figure 16 a cylindrical coordinate system specifies sound source location; and in Figure 17 a spherical coordinate system specifies sound source location. It is important to appreciate that the coordinate system used to specify the location of a sound source does not place any constraint on how the synthesized sound sources are actually disposed in the 3D volume. Aspect (1), included in claims 1, 28 and 46, is concerned with how the sound sources are disposed relative to each other, and not with the coordinate system that defines the locations of the individual sound sources – any coordinate system could be used. Similarly, aspects (2) and (3) included in claims 15, 37 and 55 can be employed with any coordinate system.

Claims 1, 28 and 46 differ from Arnold by requiring:

“the rendering positions associated with the sound sources being distributed over an at least part-cylindrical notional surface” - claim 1, step (a)

Arnold does not describe any specific distribution of synthesized sound sources. The fact that Arnold discloses a cylindrical coordinate system does not imply or suggest that the sound sources are be distributed such as to lie on an at least part-cylindrical surface. The Examiner cites column 10, lines 48-67. This passage says no more than that it is possible to use a cylindrical coordinate system to specify sound source location and that “Position information may be designated by program and such position information may be modified by user 20 and controller 30.” No indication is given as to the actual distribution of the sound sources. This passage merely concerns the rendering process.

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Claim 15 differs from Arnold by the requirements expressed in steps (c) and (d) of Claim 15:

- “(c) exploring the audio field by rotating it about a predetermined axis; and
- (d) exploring the audio field by displacing it in a direction parallel to said axis;”

Claims 37 and 55 differ from Arnold by requiring setting a rotation of the audio field about a predetermined axis, in combination with setting a displacement of the audio field relative to a presentation reference in a direction parallel to the axis

Exploring an audio field by rotating it about an axis is known from the references Applicants cited. However, Arnold does not explore the audio field by displacing the field in a direction parallel to the axis about which the field is rotatable, or displacing the audio. The Examiner relies on column 9, lines 1-12 of Arnold with respect to these limitations. This passage ends with the sentence “The perceptual positioning of sound sources may be dynamically altered to produce the sensation of relative motion between the sound sources and one or more listeners.” This statement says no more than was already known by the art Applicants cited. There is no disclosure of the specific form of the “relative motion” to be used.

The Examiner also cites column 21, lines 45-52, which refers to “control of the perceived radial and angular positioning of a sound source”. However, there is no indication that this “control” is other than causing a sound source to appear to sound at a specific location; in particular, there is no indication that “control” controls a change in position of the audio field as a whole relative to the user.

Arnold et al., at column 26, lines 61-67, refers to a “virtual reality cage that allows a user 20 to undergo motion about a plurality of axes”. Applicant does not understand what this passage

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means. However, the virtual cage is obviously not real. The reliance on Figure 16 of Arnold et al., to disclose displacing the audio field in a direction parallel to the axis about which the field is rotatable is incorrect. Figure 16 merely shows a cylindrical coordinate system and does not disclose or suggest displacing the audio field by displacing along an axis about which the field is rotatable.

The dependent claims are allowable, *inter alia*, for the same reasons advanced for claims 1, 15, 28, 37 and 46.

In view of the foregoing amendments and remarks, favorable reconsideration and allowance are in order.

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To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 08-2025, and please credit any excess fees to such deposit account.

Respectfully submitted,

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